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ABSTRACT

The influence of educational background upon the variety of English as a second language speech was examined. Adults in a rural New Mexico community were interviewed in order to elicit data on phonological variation. Data were collected through free speech, controlled speech which required the informants to translate Spanish questions to English, and specific speech which encouraged the identification of familiar objects in both Spanish and English. Twenty-four adults ranging in age from 23 to 81 participated. Thirteen had a college education, 5 a high school education, and the remainder an elementary education. The subjects with more education showed less variance in producing English. Compared to the other groups, the most highly educated group took more time in speech production or avoided the three speech features which caused difficulty. The less educated groups either confused the feature "sh" with "ch" or used variants of "th." The performance of the native Spanish speakers improved with education and this improvement did not impair Spanish production. It is concluded that bilingual speakers can pattern their speech to what they hear as the standard of the three features. (RW)

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Mildred C. Melendez

PHONOLOGICAL VARIATION: EDUCATIONAL TAXONOMY FOR ADULTS

August 1983

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The education of bilingual speakers directly influences the type of variance they show when speaking English as a second language. In a study conducted in a remote northern New Mexico community, informants were interviewed inorder to elicit data to study the features /ʃ/, /tʃ/, /θ/, and /ð/. The field worker devised three strategies for collecting relevant data: Free Speech (designated as FS on Tables 2-4) which involved free conversation with each informant about family, education, society, and the world; Controlled Speech (CS on Tables 2-4) which instructed the informants to translate Spanish questions which they heard to English questions which they produced; and Specific Speech (SS on Tables 2-4) encouraged the identification of familiar objects from thirty pictures in both Spanish and English terminology. The intention of the three procedures was to lead the unsuspecting informants to use the above features and their variants in a natural manner. Twenty-four adults ranging in ages of 23-81 participated in this study; thirteen have a college education (one year of college to seven years of college); five have a high school education only; and seven have within a third grade and eighth grade education (See Table 1).

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Table 1

Educational Background of Adults

MASTER'S +	BACHELOR'S +	BACHELOR'S	2 YRS. COLLEGE	1 YR. COLLEGE
1 male 1 female	1 male 2 female	0 male 3 female	0 male 1 female	2 male 1 female
12th GRADE	11th GRADE	10th GRADE	9th GRADE	8th GRADE
1 male 1 female	1 male 0 female	1 male 0 female	1 male 0 female	2 male 1 female
7th GRADE	6th GRADE	5th GRADE	4th GRADE	3rd GRADE
1 male 1 female	0 male 1 female	0 male 0 female	0 male 0 female	1 male 0 female

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Statistical results were measured on the way that education has influenced the use of the above distinctive features. The analysis of the three features /ʃ/, /tʃ/, /θ/, and /ð/ is presented in Tables 2-4. Asterisks (*) mark the scores that are statistically significant. An α of .05 is used. Hence, the probability is .05 for rejecting a hypothesis of equal means when in fact the means are equal (a statistical type I error). If t-cal(10) $>$ 1.81, t-cal(11) $>$ 1.80, or t-cal (12) $>$ 1.78 the hypothesis of equal means can be rejected. The number in parenthesis indicates the degrees of freedom allowed to reject a hypothesis of equal means. Numbers represent the total number of participants whose data is included and has been analyzed.

The following definitions correspond to the acronyms used in computer print-outs and used in Tables 2-4:

FS = Free Speech (Test 1)
CS = Controlled Speech (Test 2)
SS = Specific Speech (Test 3)

ip = initial position (phoneme location)
mp = middle position (phoneme location)
fp = final position (phoneme location)

STS = Subtotals
(cumulative score for test and position)

FEATURE /sh/. Table 2. Analysis of the data of three educational categories of adults (most are Spanish L_1 speakers) show the following. The college-educated bilinguals showed fewer variants of English phonemes. In the Free, Controlled, and Specific Speech tests the college group approximated standard English, while the high school and elementary groups did not. In subtotals for middle position there is no statistical difference shown. The implication is clear; as the educational level of bilingual speakers increases, so does their assimilation into English. The college group consists of seven informants, six informants are in the high school group, and seven informants are in the elementary group. See frequency distributions below.

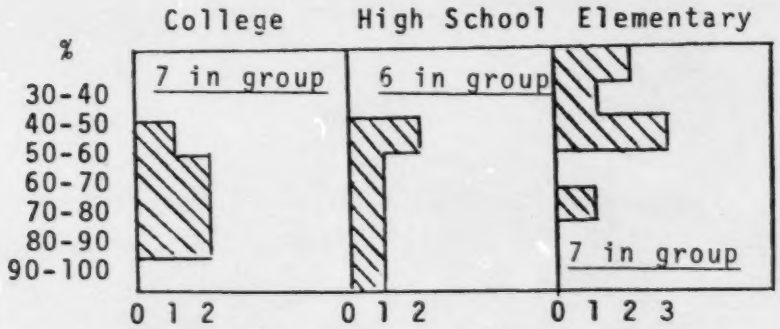
Table 2

Non-Variant Percentages of /sh/ for Educational Taxonomy

TEST AND POSITION	COLLEGE	H.S.	ELEMENTARY	COLL/HS t_{cal}	COLL/ELEM t_{cal}	HS/ELEM t_{cal}
/sh/ FS ip	74.2	66.7	68.4	*2.33(10)	1.097(11)	*3.16(9)
CS ip	91.2	50.0	58.9	*4.177(11)	*3.664(12)	.676(11)
SS ip	88.2	65.9	53.2	*2.544(11)	*3.515(12)	1.375(11)
FS mp	64.58	43.34	37.5	.907(9)	1.22(8)	.173(7)
CS mp	83.3	75.0	47.2	.289(8)	1.451(10)	.195(8)
SS mp	78.6	83.3	80.0	.194(11)	.055(10)	.122(10)
FS fp	54.8	36.7	14.2	.795(11)	*3.052(12)	1.121(11)
CS fp	48.6	50.0	71.4	.644(11)	.908(12)	.778(11)
SS fp	83.3	86.1	82.1	.193(10)	.084(11)	.287(11)
STS FS	67.1	57.6	41.3	.928(11)	*2.946(12)	1.524(11)
STS CS	83.7	74.2	58.3	.863(11)	*3.224(12)	1.437(11)
STS SS	84.5	72.1	60.4	1.503(11)	*2.776(12)	1.179(11)
STS ip	81.9	77.0	55.3	.743(11)	*3.226(12)	*2.334(11)
STS mp	64.5	65.7	40.7	.078(11)	1.627(12)	1.746(11)
STS fp	55.6	49.0	48.1	.432(11)	.606(12)	.077(11)
TOTAL /sh/	72.7	68.2	51.2	.585(11)	* 3.337(12)	* 2.105(11)

**Degrees of freedom used in calculation in parenthesis.

*Asterisk before numbers indicate statistical significance.



TOTAL /sh/: Frequency Distributions

*Horizontal axis represents the number of informants with a score which lies within the range given along the vertical axis.

FEATURE /ch/. Table 3. Bilingual speakers with a college education registered more sonscious use of the feature /tʃ/ with their demonstration of more hypercorrections and intonational changes which are recorded as heavy use (e.g. "SH," "CH," or "TH"), or light use (designated by + in the data description and appearing before or after the feature). Heavy use took the educated adult more time to produce, and light use is similar to avoidance although the feature was produced but in low voice. In total use of this feature, the high school and college groups are close statistically, and both groups have statistically larger scores than does the elementary educated group. Education makes students more familiar with standard English phonology. The types of substitutions made by the group with the least education further verifies this claim. Rather than saying "ship" for "chip," the educated adult took more time in consciously deciding which phoneme was needed /sh/ or /ch/. The use of the feature /ch/ in one of the three positions, beginning, middle, or end, in a word was more constant in the speech of the educated adult. The adult with least education mixed the substitutions of /ch/ for /sh/ more than the other two groups. While the educated adults took more time than the other adults, they achieved greater accuracy in producing the needed phoneme.

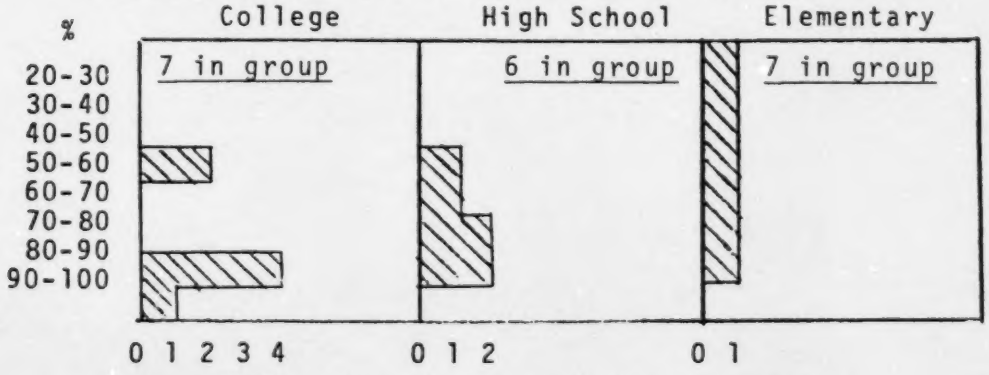
Table 3

Non-Variant Percentages of /ch/ for Educational Taxonomy

TEST	AND POSITION	COLLEGE	H.S.	ELEMENTARY	COLL/HS t_{cal}	COLL/ELEM t_{cal}	HS/ELEM t_{cal}
/ch/	FS ip	86.0	81.5	54.9	.377(12)	* 2.218(11)	1.472(9)
	CS ip	75.8	78.4	47.1	.227(11)	* 2.65(12)	* 2.598(11)
	SS ip	84.3	95.8	77.9	1.103(11)	.478(12)	1.519(11)
	FS mp	69.7	58.35	42.2	.518(9)	1.275(11)	.558(8)
	CS mp	80.0	63.8	36.2	.956(11)	* 3.048(12)	1.644(11)
	SS mp	50.0	54.2	48.8	.21(9)	.048(10)	.247(11)
	FS fp	81.0	61.2	44.6	1.138(11)	*2.543(11)	.77(10)
	CS fp	84.6	78.1	38.3	.46(11)	*3.234(12)	* 2.361(11)
	SS fp	94.5	95.8	81.7	.123(10)	1.273(11)	1.175(11)
	STS FS	78.4	72.4	38.4	.625(11)	*2.797(12)	* 2.039(11)
	STS CS	78.6	52.3	52.3	.205(11)	*2.352(12)	* 2.166(11)
	STS SS	81.5	83.5	72.2	.199(11)	.847(12)	1.121(11)
	STS ip	81.3	83.9	57.2	.297(11)	*2.348(12)	* 2.385(11)
	STS mp	68.0	61.4	42.2	.589(11)	*1.876(12)	1.505(11)
	STS fp	82.5	74.8	58.0	.881(11)	*2.599(12)	1.684(11)
	TOTAL /ch/	77.8	76.0	53.5	.240(11)	*2.504(12)	*2.32(11)

*Degrees of freedom used for calculation in parenthesis.

*Statistical significance noted by asterisk.



TOTAL /ch/: Frequency Distributions

*The horizontal axis represents the number of informants with a score which is within the range given along the vertical axis.

FEATURE /th/ (voiced or voiceless). Table 4. The use of variants for this feature was highest for the elementary-educated group according to the reading of data under Total /th/ (See Table 4). The mean for this group is about twenty percentage points less than the college educated adults' mean scores. The high school group is in the middle of the other two groups. The data for the high school and the college educated speakers show frequent standard English production of the /θ/ and /ð/ feature. The deviations from a standard representation of high, central, and low vowels for the elementary educated group, which has a large representation of Spanish L_1 speakers set them apart from the groups with more education.

Many issues can be addressed to account for the variance found in the speech of all the adult informants. First, the two types of /th/ in English speech are represented as /ð/ and /θ/ in the IPA (International Phonetic Alphabet) as voiced and voiceless features. There are variants of /d/ and /s/ for the voiced phoneme /ð/. The highest incidence in this data is in the substitution of /t/ for the voiceless phoneme /θ/. These variants especially appeared at the initial position in the Free Speech (FS) test. In analyzing the data for final position, the most dominant variant is /f/, although it was infrequent in the speech of some of the informants. The hypercorrections involved /f/ before the feature /th/ (e.g. wi[f]th), or complete substitution of the feature (e.g. too[f] for "tooth"). The variant /s/ for /th/ was used infrequently by the more educated adult than by the informant with less education, (e.g. bo[s] for "both," wi[s] for "with"). The data record excessive use of the article "the" with its three variants: th[ah], th[ee], and th[eh]. The first two are not uncommon in English speech of monolinguals or bilinguals. The third type of variant th[eh] is definitely influenced by the Spanish phonemic system and was frequent in the speech of the less educated bilingual speakers who speak English as a second language and Spanish as their first language.

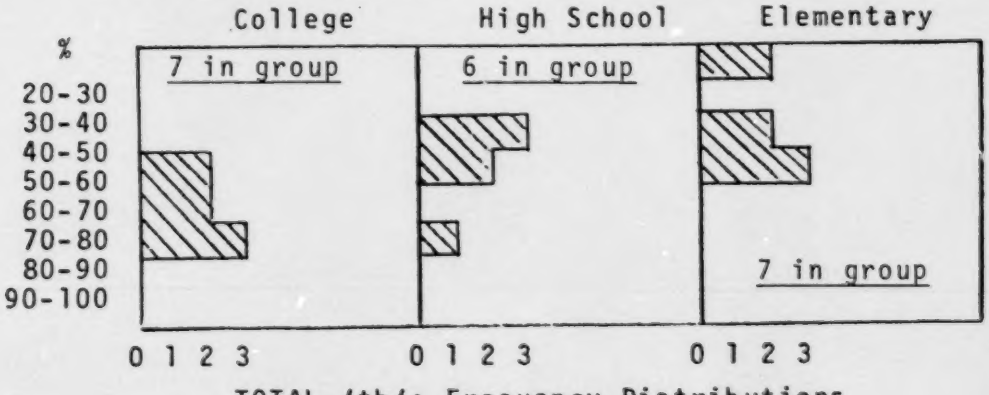
Table 4

Non-Variant Percentages of /th/ for Educational Taxonomy

TEST AND POSITION	COLLEGE	H.S.	ELEMENTARY	COLL/HS t_{cal}	COLL/ELEM t_{cal}	HS/ELEM t_{cal}
/th/ FS ip	67.1	58.7	50.97	1.259(11)	*2.953(11)	.9..(10)
CS ip	47.4	42.8	42.7	.523(11)	.628(12)	.011(11)
SS ip	57.8	50.8	55.2	.369(11)	.148(12)	.237(11)
FS mp	63.0	53.5	34.7	1.655(11)	*2.989(11)	.821(10)
CS mp	70.2	72.3	36.4	.162(11)	*2.59(12)	*3.0(11)
SS mp	71.9	58.3	55.0	.812(11)	.948(12)	.216(11)
FS fp	76.3	53.6	28.4	*2.515(11)	*5.51(11)	*1.98(10)
CS fp	75.6	62.8	44.2	.852(11)	*1.868(12)	1.466(11)
SS fp	*insufficient data*	——	12.5			
STS FS	67.3	56.8	40.8	1.691(11)	*3.013(12)	1.497(11)
STS CS	53.6	49.7	45.5	.441(11)	.995(12)	.453(11)
STS SS	64.6	51.2	56.0	1.261(11)	.74(12)	.368(11)
STS ip	63.9	54.9	46.1	1.519(11)	*3.026(12)	1.129(11)
STS mp	64.9	54.7	45.4	.949(11)	*2.073(12)	.923(11)
STS fp	75.3	56.7	36.5	*1.969(11)	*4.302(12)	*1.921(11)
TOTAL /th/	64.9	54.9	45.0	1.786(11)	*3.43(12)	1.36(11)

**In parenthesis, degrees of freedom used in calculation.

*Statistical significance noted by asterisk.



TOTAL /th/: Frequency Distributions

*The horizontal axis represents the number of informants with a score which is within the range given along the vertical axis.

In summary, the adult with more education definitely showed less variance in producing the three features in this study. The major difference of the educated group and the other two groups is that this group takes more time producing the feature, or avoids the feature by a faint production of the feature, while the other groups either confuse the feature /sh/ with /ch/ or use the variants of /th/; /d/, /t/, or /s/. The performance of the Spanish L_1 speakers do improve with education, while their native competence remains unhindered. When reasonable attention is given to changes or the commutation of sound features bilingual speakers can pattern their speech to what they hear as the standard of these features. Further, bilingual speakers do not have to make a choice of which is better, but can accomodate both the Spanish and English system in the appropriate situations. Bilingual speakers can become proficient and adept at using both systems.

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